

**ENHANCING NITROGEN USE EFFICIENCY IN ALABAMA COTTON PRODUCTION SYSTEMS**

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**Abstract**

Cotton is the most-widely produced cash crop in Alabama, with an average of 415,000 acres planted during the 2011-2020 growing seasons. Nitrogen (N) is often the most limiting nutrient in cotton production systems and must be supplemented with fertilizer applications annually. Loss pathways such as leaching and volatilization can lead to significant losses of applied N fertilizer, particularly in coarse-textured, highly weathered soils of the Coastal Plain. Stabilized N sources on urea-based fertilizers and controlled-released products have been documented to reduce gaseous N losses and increase efficiency and profitability for farmers. The objective of this experiment is 1) assess N use efficiency for various N fertilizers and stabilizers through field and laboratory experiments and 2) evaluate N fertilizer source impact on cotton yield and fiber quality. Field experiments were established at two Alabama locations. Fertilizer treatments were organized in a randomized complete block design and included: 1) urea, 2) urea + NBPT, 3) urea + duromide/NBPT, 4) polymer-coated urea, 5) urea ammonium nitrate (UAN), 6) ammonium nitrate / ammonium sulfate blend, 7) urea / ammonium sulfate blend, 8) polymer-coated urea / ammonium sulfate blend, and 9) an untreated control. Cotton yield, fiber quality, leaf samples, and soil samples were collected according to plot. The ammonia volatilization studies were performed using a laboratory incubation method where volatilization inhibitors were applied to urea-based products. These studies will help to further knowledge of N management in southeastern cotton production systems. Results will be discussed.